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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/551,826

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Thierry Duverger

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EXAMINER

COLEMAN, KEITH A

ART UNIT

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3747

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DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/551,826	Applicant(s) DUVERGER ET AL.	
	Examiner KEITH COLEMAN	Art Unit 3747	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 July 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-9, 11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clarke et al. (US Patent No. 5,271,229) in view of Dazzi (US Patent No. 4,467,757).

With regards to claims 1, 2, and 13, Clarke et al. discloses a self-igniting gasoline internal combustion engine (10) comprising at least one cylinder (14, Col. 2, Lines 65-70, Figure 1), a cylinder head closing the cylinder (18, Col. 2, Lines 65-70, Figure 1), a piston (34, Col. 3, Lines 10-15) slidably arranged in the cylinder (18), a combustion chamber (44, Col. 3, Lines 30-35) defined in the cylinder (18) between an upper face of the piston (34) and a lower face of the cylinder head (18), **an injector** for injecting gasoline (injector means 186 comprising fuel injector 190, Col. 5, Lines 55-65) into the combustion chamber (44), intake valves (82, Col. 4, Line 30, Figure 1) and exhaust valves (112, Col. 4, Line 49, Figure 1) selectively closing the combustion chamber (44), the ignition of the air-gasoline mixture being obtained spontaneously in at least a range of operation of the engine thanks to thermodynamic conditions in the combustion chamber (44, Col. 3, Lines 35-45). Clarke et al. does not disclose an injection pump intended to supply the injection with pressurized gasoline, characterized in that wherein the pressure of the gasoline provided to the injector is above 250 bars and 500 bars. Dazzi discloses an injection pump (Col. 1, Lines 20-25) intended to supply **the injector** (2, Col. 3, Line 9) with pressurized gasoline (Col. 1, Lines 10-15), characterized in that wherein the pressure of the gasoline provided to the injector is above 250 bars and 500 bars (Col. 4, Lines 48-50). It would have been obvious to a person of ordinary skill in

the art at the time the invention was made to modify the fuel injector of Clarke et al. with a high pressure fuel injector connected to a fuel pump in view of the teaching to Dazzi, in order to inject fuel in a cylinder (Col. 2, Lines 34-35 from Dazzi)

With regards to claim 3, the patent to Clarke et al. discloses wherein injection of the gasoline is made in a time interval situated at the end of the cycle of compression of the load by the cylinder (Col. 3, Lines 35-45).

With regards to claim 5, the patent to Clarke et al. discloses means for supercharging the intake air intended to be supplied to the combustion chamber (Col. 1, Lines 22-25).

With regards to claim 6, the patent to Clarke et al. discloses wherein, at least in a range of operation of the engine (Abstract, Col 1, Lines 45-55), the amount of gasoline delivered to **the injector** (190) for a combustion cycle is fractionated in the form of a plurality of partial and distinct injections (Col. 5, Lines 55-65) except a pump. Dazzi discloses a pump (Col. 1, Lines 20-25).

With regards to claim 8, the patent to Clarke et al. discloses ignition means (Col. 3, Lines 35-45) intended to produce ignition of the air-gasoline mixture in the combustion chamber (44) during the very low load or very high load ranges of operation (Col. 1, Lines 47-55).

With regards to claims 9 and 12, the patent Clarke et al. discloses an engine characterized in that it, which uses a ratio of residual gases above 20%, and preferably above 50% (Col. 4, Lines 9-15). It is noted that all exhaust or residual gases are used to drive the turbines of the turbocharger.

With regards to claim 11, the patent to Clarke et al. discloses an engine characterized in that it, which is of the direct-jet (186, Col. 5, Lines 55-56). It is noted that the fuel injectors (186) from Clarke et al. are interpreted as direct jet.

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Clarke et al. (US Patent No. 5,271,229) in combination with Dazzi (US Patent No. 4,467,757) as applied to claim 1 above, and further in view of Rouger (US Patent No. 3,741,175).

With regards to claim 10, Clarke et al. (US Patent No. 5,271,229) in combination with Dazzi (US Patent No. 4,467,757) discloses all the claimed subject matter except a variable compression ratio. Rouger discloses a variable compression ratio. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the engine of Clarke et al. or Dazzi with a variable compression ratio in view of the teaching to Rouger, in order to provide a further increase in scavenging efficiency (Col. 2, Lines 25-30 from Rouger).

6. Claims 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clarke et al. (US Patent No. 5,271,229) in combination with Dazzi (US Patent No. 4,467,757) as applied to claim 1 above, and further in view of Stevenson et al. (US Patent No. 4,417,469)

With regards to claim 4, the combination of Clarke et al. and Dazzi discloses all the limitations of the claimed subject matter including Clarke et al. disclosure of injecting gasoline in a time interval. The combination does not further discloses injection of the gasoline is made between 60 degrees crankshaft before the high dead center of the combustion cycle and 20 degrees crankshaft after the high dead center. Yamamoto et al. discloses 20 degrees crankshaft before the high dead center of the combustion cycle and 5 degrees crankshaft after the high dead center (Abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to further include 60 degrees crankshaft before the high dead center of the combustion cycle and 20 degrees crankshaft after the high dead center in order to promote fuel efficiency (Col. 1, Lines 25-35 from Yamamoto et al.). In addition, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to further provide the injection of gasoline based on crank angles of either Clarke et al. or Dazzi with a given crank angle range in view of the teaching to Yamamoto et al., in order to promote fuel efficiency (Col. 1, Lines 25-35 from Yamamoto et al.).

With regards to claim 7, the patent to Clarke et al. discloses at least one partial injection delivered during the air intake phase into the combustion chamber and during the first part of the compression, and at least one partial injection delivered around the high dead center (Col. 3, Lines 35-45). The combination does not further disclose injection of the gasoline is made between 60 degrees crankshaft before the combustion high dead center and 20 degrees after this combustion high dead center. Yamamoto et al. discloses 20 degrees crankshaft before the high dead center of the combustion cycle and 5 degrees crankshaft after the high dead center (Abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to further include 60 degrees crankshaft before the high dead center of the combustion cycle and 20 degrees crankshaft after the high dead center in order to promote fuel efficiency (Col. 1, Lines 25-35 from Yamamoto et al.). In addition, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to further modify the fuel injections of gasoline based on crank angles of either Clarke et al. or Dazzi with a given crank angle range in view of the teaching to Yamamoto et al., in order to promote fuel efficiency (Col. 1, Lines 25-35 from Yamamoto et al.).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hutchings et al. (US Patent No. 6,543,706) show the current state of the art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keith A. Coleman whose telephone number is 571-270-3516. The examiner can normally be reached on Monday through Friday between 8-5 Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrence Till can be reached on (571) 272-1280. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Terrence R. Till
Supervisory Patent Examiner

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